Listeria monocytogenes CAMP reaction

Listeria monocytogenes CAMP reaction.

J A Vázquez-Boland, L Domínguez, J F Fernández-Garayzábal and G Suárez

***Clin. Microbiol. Rev.* 1992, 5(3):343. DOI: 10.1128/CMR.5.3.343.**

CLINICAL MICROBIOLOGY REVIEWS, July 1992, p. 343
0893-8512/92/050343-01$02.00/0

Vol. 5, No. 3

Letter to the Editor

Listeria monocytogenes CAMP Reaction

As highlighted by a Letter to the Editor recently published in *Clinical Microbiology Reviews* (8), there is controversy over reported results of the CAMP reaction of *Listeria monocytogenes* with *Rhodococcus equi.*

On the basis of previous reports (6, 7, 10, 11), *Bergey's Manual of Systematic Bacteriology* (9) defined *L. monocytogenes* and *Listeria ivanovii* as CAMP negative and CAMP positive, respectively, with *R. equi*. This test was thereafter adopted as a fundamental criterion for the identification of the hemolytic *Listeria* species (5). The problem is that a number of investigators, including us, found that hemolytic *L. monocytogenes* strains give a positive synergistic hemolysis reaction with *R. equi* (1–4, 12–14). We have observed (13) that a circular or racket-shaped well-defined zone of complete hemolysis develops (with different degrees of intensity depending on the hemolytic activity of the strain) from a streak of *L. monocytogenes* in the vicinity of *R. equi*. This lytic phenomenon could be distinguished from that of *L. ivanovii*, which is typically semicircular or shovel shaped. However, in certain cases (especially when highly hemolytic *L. monocytogenes* strains are tested and when the test is performed on blood agar instead of washed erythrocyte agar), the *R. equi* CAMP reactions of both *Listeria* species are similar and can be confused.

The discordant results obtained by different laboratories might be related to the fact that strains of *R. equi* may differ in their ability to interact with *L. monocytogenes* in a CAMP test (4). However, we used the same strain of *R. equi* (CIP [Collection de l'Institut Pasteur] 5869) with which others currently find negative results with *L. monocytogenes* (7). For this reason, we requested a new subculture of strain CIP 5869 from Jocelyne Rocourt of the *Listeria* Reference Laboratory, Institut Pasteur, Paris. With the new strain, the synergistic hemolytic reactions of *L. monocytogenes* were definitely lower in intensity, so that most strains (especially those that were weakly hemolytic) could be considered CAMP negative after 24 h of incubation. After 48 h, however, a weak CAMP reaction could be observed. These findings indicate that not only do different strains of *R. equi* differ in the CAMP property but even subcultures of the same strain do. This may explain the conflicting results reported with this test.

In light of these observations and in the absence of further standardization, the results of the CAMP test with *R. equi* as presently defined for *Listeria* sp. identification (9) should be interpreted with caution.

REFERENCES

1. **Anonymous.** 1987. Note de Service du 16/3/1987, DGAL/SVHA/N87/8041. Ministère de l'Agriculture, France.
2. **Domínguez, Rodríguez, L., J. A. Vázquez-Boland, J. F. Fernández Garayzábal, P. Echalecu Tranchant, E. Gomez-Lucia, E. F. Rodríguez Ferri, and G. Suárez Fernandez.** 1986. Microplate technique to determine hemolytic activity for routine typing of *Listeria* strains. J. Clin. Microbiol. **24**:99–103.
3. **Fraser, G.** 1962. A plate method for the rapid identification of *Listeria (Erysipelothrix) monocytogenes.* Vet. Rec. **74**:50–51.
4. **Nakazawa, M., and H. Nemoto.** 1980. Synergistic hemolysis phenomenon of *Listeria monocytogenes* and *Corynebacterium equi.* Jpn. J. Vet. Sci. **42**:603–607.
5. **Rocourt, J.** 1987. Identification of *Listeria* isolates. Vet. Med. Hefte **5**:134–145.
6. **Rocourt, J., and P. A. D. Grimont.** 1983. *Listeria welshimeri* sp. nov. and *Listeria seeligeri* sp. nov. Int. J. Syst. Bacteriol. **33**:866–869.
7. **Rocourt, J., A. Schrettenbrunner, and H. P. R. Seeliger.** 1983. Différentiation biochimique des groupes génomiques de *Listeria monocytogenes (sensu lato).* Ann. Microbiol. (Paris) **134A**:65–71.
8. **Schuchat, A., B. Swaminathan, and C. V. Broome.** 1991. *Listeria monocytogenes* CAMP reaction. Clin. Microbiol. Rev. **4**:396.
9. **Seeliger, H. P. R., and D. Jones.** 1986. Genus *Listeria* Pirie 1940, 383^{AL}, p. 1235–1245. *In* P. A. H. Sneath, N. S. Mair, M. E. Sharpe, and J. G. Holt (ed.), Bergey's manual of systematic bacteriology, vol. 2. The Williams & Wilkins Co., Baltimore.
10. **Seeliger, H. P. R., J. Rocourt, A. Schrettenbrunner, P. A. D. Grimont, and D. Jones.** 1984. *Listeria ivanovii* sp. nov. Int. J. Syst. Bacteriol. **34**:336–337.
11. **Seeliger, H. P. R., A. Schrettenbrunner, G. Pongratz, and H. Hof.** 1982. Zur Sonderstellung stark hämolysierender Stäme der Gattung *Listeria.* Zentralbl. Bakteriol. Mikrobiol. Hyg. Abt. 1 Orig. Reihe A **252**:176–190.
12. **Skalka, B., J. Smola, and K. Elischerová.** 1982. Routine test for in vitro differentiation of pathogenic and apathogenic *Listeria monocytogenes* strains. J. Clin. Microbiol. **15**:503–507.
13. **Vázquez-Boland, J. A., L. Domínguez, J. F. Fernández, E. F. Rodríguez-Ferri, V. Briones, M. Blanco, and G. Suárez.** 1990. Revision of the validity of CAMP tests for *Listeria* identification. Proposal of an alternative method for the determination of hemolytic activity by *Listeria* strains. Acta Microbiol. Hung. **37**:201–206.
14. **Weaver, R. E.** 1989. Morphological, physiological, and biochemical characterization, p. 39–43. *In* G. L. Jones (ed.), Isolation and identification of *Listeria monocytogenes.* Centers for Disease Control, Atlanta.

J. A. Vázquez-Boland
L. Domínguez
J. F. Fernández-Garayzábal
G. Suárez
Departamento de Patología Animal I
Facultad de Veterinaria
Universidad Complutense
28040 Madrid, Spain